VOL. xviii.] [No. 2

THE

INDIAN FORESTER;

A MONTHLY MAGAZINE

OF

FORESTRY,

AGRICULTURE, SHIKAR & TRAVEL.

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FEBRUARY, 1892.

MUSSOORIE:

PRINTED AT THE MAFASILITE PRINTING WORKS.

1892.

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THE

INDIAN FORESTER.

Vol. XVIII.] February, 1892. [No. 2.

A Tour through Kamraj—Kashmir.

(Continued from last issue.)

No. 2

At Duabgah is the State Hop Garden; as yet only a beginning has been made, so that this year there will be no profit but it is expected that as the area is extended there will be a large surplus. Hop growing was originally started at the place years ago by the Murree Brewery Co., but various complications arose and the land was thrown out of cultivation. The Settlement Department has now taken the matter in hand, is working it vigorously and hopes to make it a source of revenue to the State. A difficulty is experienced in the supply of hop poles: hitherto, young deodars of 18 to 20 feet in height and perhaps 50 years old, have been cut, but it is manifest that this cannot continue. Without seeing a single forest it is possible to show this: here we have a country in which for ages past no restrictions have been imposed on the cutting of trees; the village houses are mostly log huts in each of which from 200 to 400 deodar *trees* are used, so that it is quite evident there can be no forests that require thinning, seeing that the villager, being allowed to take what be liked, would naturally cut that which was easiest to carry, this of course meant young trees suitable for hop poles. This was so patent to me that when, this year, I was asked to supply 50,000 more young deodars, I felt perfectly certain without leaving Srinagar that it could not be done without ruining the forests; and, having seen the tracts in question since then, I find I was well within the mark, for the forests are well-nigh ruined as it is. The long poles of *Parrotia* are now to be used for the hops and there is little to object to in this as long as they are taken in moderation and from places whence they cannot be brought in as firewood to Srinagar. Here we have one instance which shows the urgent necessity that exists for a proper system of forest conservation in Kashmir: had matters still been as of yore, it is not impossible that as the area of land under hops was extended; a year or two hence, perhaps, a lakh of young deodars would have been cut for hop poles!

Leaving Duabgah the Viji Nala was next visited; this is the last valley below Srinagar from which supplies of these stout firewood logs are brought out. The march was a short one to the village of Pánjal and being our first outing in the District everything was of interest. There is no made road but our way was along footpaths, sometimes over a grassy undulating country and through pretty little villages embosomed in apple, pear and other fruit trees, with here and there a giant chinar; then would come acres of rice fields and this was not so pleasant as the path was very wet and the ponies were ever and anon slipping into the muddy fields. As the morning wore on, it became very hot and we were very glad to arrive at our camp pitched on the bank of a pretty brawling stream, under a huge walnut tree which completely shaded the tent from the sun. The Viji Nala is among the the most picturesque of the small valleys in Kashmir: there is no open plain as in the Lidan or Lolab but the hills on either side are very low, and being well covered with trees, the view up the valley is very fine; in the foreground is the dancing water rushing over boulders and from among the pretty grey green willows and dark walnut trees on the banks, peep here and there charming little homesteads; while in the background is the dark green and blue of the great Kazinág range. These low hills of the Viji Nala were originally covered with dense kail and deodar forest, mostly the former; but, as cultivation has advanced and the demand for firewood for Srinagar has increased, the forest has been gradually cleared off and towards the lower end where the ranges of hills merge into the plains, there are only a few kail trees dotted about near and in the fields. As the valley is ascended, more forest is seen but the first compact block is not met with till the village of Pánjal is reached. This forest is known as Gujar Nár; it was thoroughly explored. It is evident from the stumps and general condition that this was once a fine forest of mixed deodar and kail with a good quantity of other species such as *Parrotia*, walunt, elm, *Celtis*, *Rhus*, &c., in the ravines, but it is now a wreck. It would be difficult to suggest any form of forest injury that has not been perpetrated here. The most common form is that of barking the trees near the ground: a strip about four feet long is taken off completely encircling the tree so that it dies in a year or so; after barking, a fire of grass, leaves, &c., is lighted at the foot apparently to smoke the surface and make it appear that the injury is an old one. This is partly the work of villagers who use the bark for roofing *machans* in fields, &c., and is also the work of the village *mochi* who requires the bark for tanning. Many thousands of fine kail and deodar have been killed in this way in Kashmir. Another form of damage is that of hacking into the trunk for torchwood (*jagni* in Chamba, *lashi* here) and it is peculiarly exasperating to a forester to see a grand kail or deodar with a deep hole cut into it simply to supply a villager with perhaps one winter's torchwood. In one part of this forest

every kail had been barked after which fire had been applied to the grass and undergrowth so that nothing remained but a number of dead blackened poles ; other trees have had huge holes cut in them for the extraction of resin (*ganda baroza*) and some had holes made merely to hold up the supports for logs to be squared, &c. There are ash *(Fraxinus floribunda)* in fair quantities in this forest but not one can be found that has not been pollarded for the supply of winter fodder for cattle. As there has been no restriction on felling, except that a year ago an order was issued that nothing under 6 foot girth should be cut, which order has, it is to be feared, commanded little obedience, nearly everything has been cut. First went the young poles used by the villagers for building, then the trees of small girth as being easist to cut and finally anything that would yield a supply of firewood and could be easily got at. There is a standing order that no village is to cut any trees for building without written permission ; little attention is paid to this and several men were caught redhanded, one having felled no less than sixty young kail about 2 feet in girth to repair his house, their one answer when caught is *bé khabar* !

It was quite evident that even the wreck of this forest would not escape unless something was done at once, and as this forest is valuable by reason of its proximity to the line of export, it was at once demarcated with pillars and a ten foot boundary line cleared round it. It is possible that in the course of years it may become a valuable forest, as it still contains a number of fine seed bearers on the crest of the ridge. A good deal of opposition was experienced from the villagers while the demarcation was being carried out : they objected to any culturable land, whether covered with trees, or not, being included in the forest ; their claim was that they had always been accustomed to clear what land they liked for cultivation and could not exist unless this was continued, they were asked where they would obtain timber for building, and firewood when all was cleared, and replied that God would provide it ! This is merely mentioned to show what a difficult task is before the Forest Department in Kashmir. One thing that must be altered is the method of house construction, at present where the village is near the forest, the houses are built entirely of young trees : sides, ends, floors and roof trees are all formed of poles, with a thatch on top. In this way over 200 young deodars have been counted in an ordinary sized house, while some of the large ones have used up as many as 400 young deodars ; no forest, however extensive, could long stand such a strain.—Where there is no forest at hand, houses are built of sun-dried bricks bound together with beams here and there to withstand the shocks of earthquake, and this system must be adopted everywhere if any forest is to remain to the State.

In strong contrast to the treatment of other trees is the care the villagers take of the walnut : whether in a village or forest, not a leaf is touched and no injury is ever done to the bark

though this is very valuable for tanning, but then the walnut is a source of income to the villager and he is wise enough for this. In fact the walnut trees are one of the sights of Kashmir, for numbers, size and luxuriant growth they are probably not to be excelled in any country in the world, and among the chief beauties of this valley are the the park-like groups of Walnut in the greater number of villages.

Very few ferns are to be found in the Viji Nala, the principal ones are several varieties of *Lastrea Filix-Mas*, L; *Lastrea Thelypteris*, Desv.; *Diplazium, japonicum*, Thunb; and one which is possibly *Athyrium McDonelli*, Bedd. if so, it is one of the commonest ferns here, growing with *L. Filix-Mas* in shady or damp places in great luxuriance, individual fronds being 4 feet long and over. Should it be this fern, it is surprising that it was not found here and described before I first came upon it in the Bhandal Valley in Chamba. There are a few other ferns here but nothing out of the common.

From Pánjal our next march was to Kitar Daji in the Hamal Valley. After crossing the Viji stream the path ascends over a low range of hills and through a lovely forest of almost pure kail and to the ordinary traveller there would be nothing but admiration but alas for the forester! his eye cannot help noting the grievous injuries done to the forest he passes through and this was no exception; trees barked, hacked and lopped were to be seen on every side and in the very centre was a Goojur hamlet but lately established and already making its baneful presence felt as was evidenced by the dead trees outside the small patch of cultivation. Still, there are some fine compact blocks of forest here, and there is yet time to save them from the enemy. This is a very fine valley both for forests and landscape, the stream traversing it being of large size and one which evidently has a great volume of water when at its highest. Above Kitar Daji are some very pretty bits of forest scenery and these I explored for ferns very soon after I arrived, several species were obtained here, *Athyrium nigripes* Mett. of large size, *A. thelypteroides*, Michx. very fine and *A. Filix-femina* var. *dentigera*, Wall or *attenuata*, Clarke. The next morning was spent in an exploration for several miles up the valley by a path which eventually crosses over the range into the Kishanganga side. This path ascends very gradually partly through forest and then over grassy slopes till about 7000 feet elevation when the valley becomes narrow and there is forest an both sides almost entirely of spruce and silver fir and yew. Cultivation and its attendant destruction to the adjoining forest has been left behind but though the former ceases, the latter does not; higher up a Goojar hut was reached tenanted by one family only and yet no less than ten large silver fir were found, just outside the hut, barked only a short time before to roof in a wretched shanty which will collapse with the first fall of snow. Next year, if not prevented, this man will bark another lot of fine

trees to make another shanty and so it has gone on for generations past. Is it to be wondered at that the forests are gradually disappearing in this country? Great numbers of mushrooms were found on the grassy slopes and a grand supply taken back to camp where they were much relished on toast and in stews, &c. Some very large specimens of *Cystopteris fragilis*, Beruh, over one foot long were gathered on the banks of the stream. There being no friendly walnut tree in this place the tents had to be pitched in the open and it was quite surprising to find how hot it can be in the vale of Kashmir at this time of the year. Mosquitoes also are a great plague towards evening and curtains are quite indispensable. A specimen of "Kuth" (*Saussurea Lappa*, Clarke) was brought to me here: this is a very mysterious root, for I can find no one who knows for certain the uses to which it is put. The Kashmir State exports large quantities to Bombay but the demand is an intermittent one; some years every maund is bought up, then for two or three years none is *sold*. From enquiries I have made, it would appear that in Kashmir, at any rate, it is used medicinally, one account is that in China it is used in making joss sticks, another, that it used to be called *Aplotaxis auriculata* or *Aucklandia Costus* of Falconer and in an old edition of the Calcutta Pharmacopœia it is called *Costus arabica* of the ancients, and is said to be exported to China as a narcotic in lieu of, or together with opium; evidently it requires working up, for the Kashmir Revenue when it comes is a large one. I am surprised that I never heard anything of it while in Chamba, it surely must grow there as well as in Kashmir. After leaving Kitar Daji we passed through the Mawar valley which is a jaghir of Raja Amar Singh, this contains some very fine forests and is a lovely country to travel in; the village of Karil is especially pretty; the encamping ground being a level bit of grass shaded by large apple and pear trees. Truly Kashmir is the country for fruit, the pity is that it is so poor in quality, for though every village and even the borders of the forests and fields contain many pear, apple and plum trees, hardly any of the fruit is worth eating; but in time there is little doubt that the traveller will pass through orchards of russets and pippins of sorts and French apples, besides European varieties of the pear, for already, it is believed, arrangements have been made by the Settlement Department to supply plants to villagers. When the Railway is open to the plains, residents of Lahore will probably be able to enjoy as good fruit as they can get in England at a quarter of the cost. At present, even in Srinigar, splendid European apples, that would cost three pence each in England, can be bought for five annas per dozen.

J. C. Mc. D.

(To be continued).

The Tortrix of the Teak Tree.

Every two or three years, Teak trees, more especially those growing in plantations, seem liable to attacks from the larva of a *Tortrix*, which abounds in such numberless strength as practically to destroy the entire foliage of the trees. The most striking of these ravages that occur to me is one that took place in the Kyetpyoogon plantation of the Rangoon Division about 1884, and another in the Pyun Chaung plantation of the Toungoo Division in 1889. In both these cases, the entire foliage was destroyed in April and May, shortly after the flushing of the spring leaves. The leaves were perfectly denuded of all their soft cellular tissue containing the chlorophyll by means of which the circulation and assimilation of the sap are accomplished, and only the bare skeletons of the leaves were left uneaten, and these withered and fell in the same manner as if they had been shed after normal accomplishment of their intended task. These ravages of the *Tortrix (Tectonae ?)* are really of very considerable importance. From April till July, when the summer flush of leaves comes, the increment in growth is lost almost entirely, and the later increment of the year must to some, and in all probability to a considerable extent, have been affected by the denudation of leaves previously.

The occurrence of these attacks and details as to their magnitude do not yet find a place in our Annual Reports, although in all likelihood they do as much (or more ?) harm than a fire, unless the latter passes through plantations where the accumulation of débris is great. The details are entered in the reserve journal in a general sort of way if the reserve journal is properly kept, and it may, perhaps, be incidentally mentioned in a divisional annual report, but there the record ends, and the objectionable caterpillar is never mentioned to the local Government or the Government of India.

On changes of Divisional Officers taking place, one's interest in the destructive larva is apt to run down, hence no one has yet, so far as I am aware, made out a list of the years during which any one particular plantation has suffered severely. By such means we might arrive at a correct estimate of the period of complete generation, which would have a scientific interest, but which would be of no practical use, it is to be feared. At any rate in Europe they have not been able to apply any practical measures for obviating or even minimising the ravages of *Tortrix viridana* on the oak, or *Tortrix podana* on young growth of Beech.

In Europe the *Tortricidæ* consist of 10 genera and 436 species. The *Tortrix viridana*, which destroys the young spring leaves of the oak, swarms at the end of June and beginning of July, and lays its eggs on the leaf-buds in process of formation after the midsummer flush of leaves ; the larva appears in the

following April and May, and enters the chrysalis stage about the end of May or the beginning of June. Its generation is simple ; it is of common occurrence ; *it sometimes appears in large numbers.*

If the generation of our Teak *Tortrix* be similarly simple and annual, (which seems open to very reasonable doubt) how can we account for its occurrences every three or four years in such numbers as to denude large areas of plantations of their spring foliage? It can evidently not be the result of unsuccessful fire-protection, leaving the poles and saplings in a somewhat debilitated condition, for the ravages are found occurring sometimes after successful protection, and in plantations forty or fifty miles apart, in one of which fire-protection may have been successful, while in the other it was not. Thus, in 1889, when the Pyun Chaung plantations were denuded of their leaves from April till July, similar phenomena, though not quite in such a conspicuous degree, occurred simultaneously through the Teak plantations in the Saing and the Swa.

In the oak forest around Erfurt serious damage was done during four successive years (1869-1872), whilst a similar record is shown for the university forests of Greifswald. Kyetpyoogan is said to have suffered much in 1889 and portions of it have been damaged again in 1890 and 1891. In Europe no active measures can be adopted against *Tortrix viridana* : Hess, one of the highest authorities on the subject, can only recommend the preservation of birds which feed on grubs, and adds " in regard to its destruction hardly anything can be done."

The European species which attack the oak and the beech and spend the time of their chrysalis stage either in cracks in the bark or in rolled up leaves attached to the upper branches. Those species however which attack conifers *T. histrionana, murinana buoliana, &c.*) pass their chrysalis state either in flimsy cocoons spun at the base of twigs, or else on the ground. Thus : *Tortrix murinana*, which attacks the silver fir, after continuing its work of destruction on the needle-like leaves from April till June, lets itself down to the ground by a cobweb-thread-like emission, and enters the chrysalis state on dead leaves covering the soil ; about a fortnight later the small butterfly appears as a perfect insect.

This is exactly what takes place in the case of our *T. Tectonae* ; about the end of May in going through plantations that are leafless from their attacks, one can see thousands and thousands of the caterpillars working their way down to the ground on delicate cobweb-like threads proceeding from the leaf-skeletons forty to seventy feet over-head. *T. murinana* is therefore evidently the European variety which interests us most and in regard to which we can learn something of use. The measures adopted to prevent and destroy it are :—

Prevention.

I. Mixture of the silver fir with other trees, and attention to clearing, weeding and thinning.

2. Protection of its enemies (birds).

Destruction.

1. Smoking out of the larvæ by burning green branches during damp weather in May.

2. Driving swine into the forests during the first half of June, when the chrysalis are on the ground.

3. Removal of the dead leaves from the soil during chrysalis stage.

4. Cutting out of trees badly attacked.

With our system of fire-protection, therefore, we appear to be doing our very best to foster and propagate this pest of our Teak productions ; this is the first conclusion that can be drawn from what has been said above. The second conclusion, and from a practical point of view the more important, is that our pure plantations of Teak are not, perhaps, so well adapted to the requirements of nature as mixed plantations would be, and the question may well be raised whether, or not, to a very much greater extent than at present, *Improvement fellings* in carefully selected Teak producing localities might not, to a great extent, take the place of our planting operations, as combining the advantages of a more natural treatment of the Teak with a diminution of the danger from this insect enemy, whose interference with the development of our plantations has not hitherto, in my opinion, received sufficient attention. That the *Tortrix*, however, does not spare Teak trees in a mixed crop, or even isolated trees, has been observed this year in the Kangyi reserve of the Tharrawaddy Division.

J. N.

Famine, and the Forests of Bellary.

We extract the following from the 'Madras Mail' quoted in the 'Indian Agriculturist' of 26th December, as likely to be of interest. It shews clearly that, especially with such enlightened officers as Mr. Robert Sewell, the present Collector of Bellary, the policy which was inaugurated by Sir M. E. Grant-Duff under the advice of Sir D. Brandis of enlisting the sympathies of Madras Revenue Officers in the work of Forest Conservancy, has had excellent effects.

" The cattle, of course, are badly off, and had it not been for ' the grazing available on the Sandur Hills thousands upon ' thousands would have died. With reference to cattle mortality, ' Mr. Sewell has some very sensible remarks to offer. He thinks

'that "little can ever be gathered from general statistics which 'show only number of deaths or increase of the number observa-'able of half-starved or miserable animals, for the reason that 'most stock-owners have far too many animals, and they take 'no pains to stall-feed the old and useless ones, but drive them 'off to pasture as they can; and it is amongst these that the 'scarcity of fodder makes itself first felt. But their death is 'really a relief to the owner, and is often positively a gain instead 'of a loss. Ploughing cattle and the better kind of domestic 'cattle are stall-fed, and it is the loss of these only that is really 'serious." Further on he adds:—"I should mention that I am 'doing my best to avoid the necessity of throwing open the forest 'reserves. If the reservation is to be any good at all—if the 'whole theory is not fallacious—we are, in this district, of all 'others, in need of increasing the annual rainfall by increasing 'forests and tree-growth in every available locality, and to throw 'open the forests is to condemn all young growths to utter des-'truction. The herdsmen, as I have myself seen, strip the trees 'of every leaf (and therefore kill them), break down the saplings, 'and ruin all hopes of successful growth for many years to come. 'It may seem very hard-hearted, but I care little for the class 'of old and useless cattle previously alluded to, and want only to 'secure the stall-feeding of ploughing and useful domestic 'animals."

It would be well if some of our North Indian Collectors would make similar practical personal observations to those made by Mr. Sewell: except occasionally for Shikar they seem rarely to enter a forest and never to take an interest in its improvement. The Sandur Leased Forests contain, usually, a magnificent supply of fine fodder grass, but they also are badly in want of rest to allow the tree-seedlings to come on, and it would be the greatest of pities if they were allowed to be overrun by poor, almost useless herds, while a little management would admit of the cattle being fed on cut fodder. We are very much pleased to see Mr. Sewell advocate, what the Madras Forest Officers have long advocated, the clearest of distinctions being made between the valuable well-bred domestic cattle which are used for ploughing, for well-work, and for draught; and the miserable undersized weak herds whose only use is to give manure, most of which only serves for fuel, and to provide, when they eventually die, hides for export. We hope Mr. Sewell's views will meet with approval by the authorities and be adopted elsewhere, wherever possible, and tend to encourage the ryots to improve the quality of their stock and by restricting miscellaneous breeding, maintain only the animals which are really useful, the great benefit of the forests and of the pasture supply of the country.

Forest petitions in Ganjam.

We recently gave some extracts from the 'Madras Mail' with the text of extracts from an address to the Governor of Madras from the people of Hospet in Bellary, with his reply. The following similar extracts from a petition presented to Lord Wenlock in November 1891 by townspeople of Berhampore in Ganjam may also interest some of our readers. The address said:—" Whilst we readily admit that the conservancy of Forest is 'a matter of prime importance, we beg to point out that the fees 'now levied by the Forest Department are very excessive and are 'pressing very hard especially on the poor and on the ryots. The 'fee formerly charged on a cart load of bamboo thorn was four 'annas; but now it has been raised to Re. 1-4-0 and the result 'is that the ryots find it impossible to properly fence their fields 'against cattle trespass. So with regard to dry fuel, the seigni-'orage has been raised at one leap from four annas to Re. 1-4-0 'a cart load, and in consequence the poorer classes often eat food 'that has not been properly cooked. So greviously do these 'measures press upon the poor that we feel we cannot too strong-'ly urge upon Your Excellency's attention the need for a speedy 'revision and material reduction of these rates. Closely connect-'ed with these matters is the loud complaint of the ryots about 'the insufficiency of pasture. They say that most of the avail-'able Government waste land is being demarcated and reserved 'without sufficient regard to the urgent need of pasture lands for 'the ryots' cattle. So much of the District's welfare depends on 'the ryots' cattle being in a fit condition, that we beg that Your 'Excellency will give this matter your favourable consideration."

Lord Wenlock replied as follows:—" As regards the hard-'ships resulting from the carrying out of the forest laws and rules, 'no doubt it is difficult for those who pay fees to thoroughly 'appreciate the fact that their payment is desirable in their own 'interests; but it is the bounden duty of Government to protect 'the forest and to improve the pasturage of the country, and in so 'doing it endeavours as far as possible to minimise the resulting 'hardships and to raise or lower the fees prescribed with due 'regard to the resources of the payers and to the character of the 'season. I trust that in future, pasturage may be provided at 'almost nominal rates; but at present you are paying but one 'pie per load of grass, a fee of which it is hard to complain. 'These are times when even this might be advantageously re-'mitted. Its payment, however, as a rule, ensures pasturage for 'the better cattle in years of drought. In such seasons the older 'and less useful animals no doubt suffer, but it would be the first 'duty of Government, when all head of cattle cannot be saved, to 'endeavour to keep alive those which are absolutely necessary to 'the cultivator. In respect of seigniorage rates levied on bamboos,

'the general rate sanctioned by Government is Rs. 1-4, but the 'Collector has the power of reducing it and he exercised this 'power and reduced it to 8 annas, whereupon the Board of 'Revenue finding that this District did not contribute its fair 'share to the expenses of forest conservancy, and that a higher 'rate might reasonably be levied, raised it to Re. 1, and I must 'remark that private owners charge considerably more, and that 'Government must obtain at least a reasonable return."

That it is not only the Governor and the officials in Madras that hold strong opinions on the necessity for a firm and continuous forest policy, is clear from the following newspaper extract.—"*The Forest Laws.*—From the proceedings of the National Con-'gress on their third day we see, says the *Madras Times*, that a 'motion was advocated earnestly entreating the Government to 'mitigate the harshness of the forest laws. We sincerely trust 'that Government will do nothing of the sort, for while we 'sympathise with the people on whom the sins of their fathers 'have been visited, we cannot in justice to posterity urge that 'the punishment should be lightened, for it is not a whit more 'severe than the occasion needs, and has already been delayed 'for some decades too long. Lord Wenlock has spoken more 'than once admirably on this subject."

The 'harshness' complained of lies in the rates which are charged under order of Government for produce removed by purchasers, not from the Reserved Forests but from the Reserved and Unreserved Lands. To any one who may think these rates very 'harsh' we suggest a careful examination of them. It would not be easy to make them much lower than they are and rightly are. We doubt if the native gentlemen who prepare these addresses really themselves have ever gone into the question—the paragraphs, we suspect, are only too often suggested for insertion by some one directly interested not in the supply of the villagers so much as in the trade in forest produce.

Kashmir Products.

The products (minor forest produce) alluded to in the Kashmir Report (*Indian Forester*, September, 1891) are interesting and some of them, if not all, easily identifiable.

Two sets of products are noticed :—

(1) Those of the upper or temperate hill forests : (2) those of the hotter, lower-hill forests about Jamú.

1. Banafsha or violet, is well known : the flower is dried and is said to be diaphoretic, also said to be laxative. The species is given as *Viola serpens*, the root (bekh-banafsha) is said to act like ipecacuanha. In the Hazára hills I have found a dark flowered violet, beautifully scented. Stewart notices this as *V. Patrinii*, DC.

2. Kahzabau (Káh-or gáo-zabán—'Cow's tongue', from its rough leaves), the flowers, leaves and roots are all used. It is said to be imported from Afghanistan. The flowers sent to the Punjab exhibition were cuttings of *Boragineæ*, perhaps *Anchusa* sp. or *Onosma*. The root called "Ratanjot" is used for dyeing red: various plants are probably collected under this latter name.

3. Bihi-dána: are the seeds of the quince: is this wild anywhere? The seeds are mucilaginous when boiled. In Europe, hair cosmetics (bandoline, &c.) are made with them. Demulcent, cooling.

4. Zíra: the traveller in the hills must have noticed this yellow-flowered unbellifer. *Carum Carui (or C. gracile)* is the black zíra or carraway. Safed or white zíra, is cummin, *Cuminum cyminum*: this is said to be wild on the N. W. frontier, but does the writer not mean *Bupleurum marginatum*, the seeds of which are also aromatic?

5. Guchhiári, are those shrivelled dry 'morels' which are strung together on a coarse string and sold in the bazars in Kashmir. Dr. Cooke found, in a string sent to him, *two* species—one he named *Morchella deliciosa*, and the other *M. gigaspora* nov. sp.

6. Kooth (Kúth) is the strong-scented root which is used to preserve shawls from moth, and is, or used to be, always packed up with bales of shawls and woollen goods from Kashmir. (*Aucklandia Costus* or *Saussurea Lappa*.) It is said to be largely exported to China for use as incense. It is noted as a monopoly of the State; that is, the Court has the right of buying from the collectors all the produce at a fixed rate. The books distinguish two kinds of kúth (as applied in medicine) one called 'shírín, or sweet, the other 'talkh' or bitter.

7. Kour (perhaps for Kúr not Kaur?) some kind of root is meant apparently. *Holarrhena antidysenterica* is called 'Kawar' in some places, also Kúrá; but it is the seed and bark of the small tree that are used, so that something else must be meant; perhaps *Gentiana Kurroo?* or a valerian?

8. Dharêkari: (this appears to be drisikarí or dresikari also called egilbír or Akalbír.) A yellow dye root, for silk chiefly; root of *Datisca cannabina*.

9. Malin: as no accent is used, it is impossible to say what is meant, Mâlan? or Malîn? or Malin? (both short) Stewart mentions a Kashmir root (exported, he says) called mŭlín; it is used in a pounded state and applied to abscesses:—this he refers to *Solenanthus* sp. (*Boragineæ.*)

10. Rasaunt is ordinarily a yellow substance obtained by boiling nearly to dryness the juice of *Berberis* sp.: the Reporter says that the product is obtained by boiling the root of Kanbel, this I cannot identify.

13. It is interesting to note that *Sapindus* is used as a source of *dandása* as well as *Juglans*: the astringent bark is used variously; especially as a tooth cleaner.

15. Unāb, is the Bazar name for the fruit of the Ber (*Zizyphus* sp. var). Surely this name is not used for the wild fruit (Berí, sinjlí in Kashmirí),

17. Dhúp is noted in connection with Kút; and indeed *Dolomiæa macrocephala* is used as *incense* (Dhúp), and grows in places like those where *Saussurea* would be found, at a still higher elevation.

18. Harvi is said to be a poison—evidently a root. It is unknown to me, possibly *Aconitum ?*

19. Wild ginger, is too vague for identification; probably "banhaldi" (bazar Kapúr, Kachrí) *Hedychium spicatum* is meant.

20. This gives another name for the Birch-bark on which orders, letters, &c. are written in Kashmir and in Chamba. The bark is used for wrapping and packing: it is noted as a State monopoly: does the writer mean 'tuz' or 'taz' or túz?

21. Revas (edible) perhaps for riwás or ribás, the shop name for rhubarb *stalks*, as 'rewand' is for the *root*, (No. 28 of the Report.) The species of *Rheum* are several, in the Himalaya from 6,000 feet to great heights, indeed to the snow line.

22. Bartang (Bártang): is this *Plantago sp?*-and the ísabgol of the druggists' shops?

23. This I cannot trace.

24. The same:—Kanocha in the druggists' shops is the seed of *Salvia Moorcroftiana*, or other species said to be useful in dysentery, &c. (called also Kalauncha).

25. Werch, is referred to *Acorus Calamus:* it is an aromatic tonic: if so, it is a semi-aquatic or swamp plant, with a long branching rhizome creeping in the mud. Further enquiry is needed: there is some doubt whether an *Iris* root is not meant.

26. Afúmun, is the same as ákás bel, the *Cuscuta reflexa*, well known as a pest on trees.

27. Kasús, is really (as found in druggists' shops) in part the seed of this same *Cuscuta;* both these names are shop or officinal terms, not local.

28. Ravand (Réwand or Revand) is the rhubarb *root.* I believe the Himalayan species are not determined very well: it seems certainly the case, that some species, though giving the pleasant sub-acid stalk (réwás) have no material quality in the root, or only have it in a very inferior degree.

29. Uskhuddus: this is a (perhaps the Report-writer's, perhaps apopular) corruption of Ustukhádús: which is the *officinal* name of a drug recognized in the Yunání medicine practised by Hakíms. It affords a curious substance of what is often observable in Hakíms' drugs. The Yunání medicine is simply copied through Arabic translations from the old Greek writers. Now these latter had a drug, *Lavender*, or *Lavandula Stœchas*, but the (Arabic) Ustukhádús is merely a "juggle" of the Greek Stoikhas (Stoikhades, inflexed). All the specimens we examined were *Prunella*

vulgaris, which grows freely all over the hills: it is quite inert and of course possesses some of whatever virtues the aromatic *Lavandula* has. But the Indian Hakíms were bound to find local plants to fit in with the *rough descriptions* of the plants in the Greek medicine books. How rough they are may be seen by reading the "Mahíyat" or essential features of the drug plants as given in such authorities as the "Makhzan-ul-adwíya" &c. Lavender was widely described as a *spike*, with a distinct calyx to each floret and a lilac or purple hooded flower; and this, as the *Lavender* does not flower in India, is referred to *Prunella* which now is found in druggists' shops as Ustukhádús. Many other drugs of European origin, in the Greek books, have these Indian substitutes found for them, owing to rough similarity of form, without the remotest reference to properties or efficacy!

Turning now to the products of the Jamú (lower) hills.

1. A'mila (ámla or *aonlá* is the well known acid semi-translucent fruit of *Phyllanthus Emblica*, fancifully called 'emblic myrabolam," because so often used in native medicine with the two "myrabolams" (*Terminalia Chebula*, and *T. Belerica*). The three are pounded together as an astringent, with or without salt, to form "triphadá"—the three-fruit compound.

2. Balela or Bahera, *T. belerica*. } The nut or fruit.
3. Halela or har, and harar, *T. Chebula* }

4. Amaltás: the well known long (black when ripe) cylindrical pod of *Cassia (or Cathartocarpus) Fistula*: it is purgative.

5. Shell-lac (sic) does not grow on any tree: crude lac is the product of an insect puncturing the bark of ber and other trees and it is made into *shell*-lac by melting and straining through cloth when liquid (and thus removing impurities): it is allowed to drop and spread out on broad pieces of plantain stem (Khelá) to which it does not adhere, and then dries. Then it is *shell*-lac or purified lac. Or rather '*shell*-lac' is applied in Europe to still further refined lac: it is, I believe, dissolved in spirits and evaporated, forming thin sheets which break up into little bits like shells.

6. and 7. Need no remark.

8. Is "Kishta" *un*ripe peach and wild apricot dried: used in dyeing, and to clean silver (for which it is first rate—the silver article is covered with a stickly paste or soap made of kishta and water and than heated hot in a charcoal fire.)

10. "Gillo" is found in the shops as "Sat-gilô"; *i.e.* the feculá of the root collected and dried. Stewart says, the "dry-extract:" to me it looks like collected powder or fecula. *Tinospora cordifolia (Cocculus, DC)*

11. Harmal: the drug so called is abundant on waste broken ground in the plains: at one time the seed was used in Europe in dyeing a peculiarly "Sienna" brown, known some years ago as "Bismarck brown." Curious superstitions exist among natives about burning the seeds to drive away evil-spirits. (*Peganum Harmala*) (*Rutaceæ.*)

12. Bil-kath, or Kath-Bel. (wild Bel) is *Feronia Elephantum* or perhaps *Aegle Marmelos*, which is cultivated as the bél or "bael" fruit. *Aegle* is, I understand, found wild also.

14. Mál-Kanganí. The red seed of the large shrub* (hardly tree) *Celastrus paniculata*, given to cattle, as also to men for rheumatism; an oil is got from the seeds, and used both internally and externally for the latter complaint.

15. Wawring, (Wá-warang, Wai-warang, also bé-barang.) referred to *Myrsine africana:* the berry of the shrub is anthelmintic (ripe in October). The bebrang" of the medicine book is called "*Embelia Ribes*" but this is not an Indian species, at least not in the Panjáb. A similar name appears to be given to the seeds of another plant, also anthelmintic *Rottlera tinctoria* (*tree* called Kámila or Kaméla)

16. Taj—is a name for cinnamon bark; and here, I suppose applied either to *Cinnamomum albiflorum* which occurs in the Himalaya (Stewart) or some *Cassia ?*

17. Medásak: is the bark of *Tetranthera Roxburghii* pounded and wetted with milk, &c., and applied to contusions.

18. Baroza, (ofte n ganda-biroza) is the *crude* resin or turpentine (not gum) of chíl (*Pinus longifolia*).

19. Chalwá (or Chilwa) is the seed of the Chíl pine. Is this used for food ?—It is not meant, I suppose, to refer to the chilghoza or edible seed of *Pinus Gerardiana.*

As to the *fruits* said to be *wild.* What is meant by *Apples:* are these wild (edible) Crabs ? The wild pear is perhaps kaint *(Pyrus Pashia).* Sour grapes (sic), what are they ? I found *wild* grapes in Kághán quite edible, small, black and sweet, are they originally wild ? Is there any Plum *(Alucha* or *Prunus)* wild ? Peaches are *practically* wild in parts of the hills, so are apricots.

Oxford, Nov. 1891. B. P.

**Note.—Climber, Hon. Ed.*

The ferns of Pachmarhi and those of Mahendragiri.

While at Saharanpur lately, I was looking over some interesting collections made by Mr. J. F. Duthie in the Hills of the Central Provinces; and being particularly struck by the number of interesting ferns which he had found, which I should not have expected to have occurred in that locality, I asked him for a list of his collections. He has, consequently, kindly supplied me with the following :—

Gleichenia dichotoma, Willd.
Cyathea spinulosa, Wall.
Alsophila glabra, Hook.
Davallia tennifolia, Sw. var. Chinensis.
Adiantum caudatum, L.
„ Capillus-Veneris, L.
Cheilanthes farinosa, Kaulf
Pteris longifolia, L.
„ quadriaurita, Retz.
Asplenium heterocarpum, Wall.
„ esculentum, Presl
Nephrodium calcaratum, Hooker var. ciliatum.
„ falcilobum, C. B. Clarke
„ cochleatum, Don
„ sparsum, Don
„ molle, Desv.
„ cicutarium, Baker
Nephrolepis cordifolia, Presl
, exaltata, Schott
Polypodium multilineatum, Wall.
„ lineare, Thunb.
Acrostichum appendiculatum, Willd.

(*Note.*)—Pinnæ of barren frond all acuminate caudate instead of blunt. Pinnæ of fertile frond very long (C. W. Hope)

„ variabile, Hooker
Osmunda regalis, L.
Lygodium pinnatifidum, Sw.
Angiopteri evecta, Hoffm.

In all there were 26 species. Pachmarhi lies at the highest point of the Satpura Range, in latitude about 22½ degrees N. and longitude 78½ degrees E. and the species of greatest interest among those enumerated are the *Acrostichum appendiculatum*, the huge fleshy *Angeriptions evecta* and the two tree ferns *Cyathea* and *Alsophila*. It was also interesting to find the flowering fern *Osmunda regalis* and the *Gleichenia*.

A few years ago, I paid a visit to a very interesting mountain on the East Coast, 4,500 feet high and only ten miles from the sea, off the little Port of Barwa in Ganjám. The mountain is known as Mahendragiri and it lies in the territories of the Raja of Mandasa. It is, like Parásnath, a celebrated Jain place of pilgrimage and the temples alone are interesting and are fully described in Professor V. Ball's "Jungle Life in India." But the botany is extremely interesting, for on Mahandragiri, seem to meet the North and the South, the Himalaya and the Nilgiris. It is a matter of the greatest regret that I have not kept any list of the plants in general; but as, on my return to Chicacole, I met Mr. E. Sewell C. S., then Sub-Collector, and I found Mrs. Sewell

had collected ferns also on Mahandragiri, I drew up the following list of thirty four species found on the mountain.

Gleichenia dichotoma, Willd,
Cyathea spinulosa, Wall.
Alsophila glabra, Hook.
Davallia tenuifolia Sw. var. Chinensis
" pulchra, Don
Adiantum caudatum, L.
" lunulatum, Burm.
" Capillus-veneris, L.
Cheilanthes tenuifolia, Sw.
" farinosa, Kaulf.
Pellæa concolor, Langs. and Fisch.
Pteris pellucida, Presl
" quadriaurita, Retz
" aquilina, L.
Blechnum orientale, L.
Asplenium laciniatum, Don
" crinigerum, Bedd.
" drepanophyllum, Baker
" oxyphyllum, Hook.
" esculentum, Presl
Nephrodium cochleatum, Don
" sparsum, Don
" molle, Desv.
" unitum, L.
" cicutarium, Baker
Nephrolepis cordifolia, L.
" exalta, L.
Polypodium multilineatum, Wall.
" lineare, Thunb.
" membranaceum, Don.
" fissum, Bl.
Hemionitis arifolia, Burm.
Lygodium pinnatifidum, Sw.
Angiopteris evecta, Hoffm.

It is worth mentioning that a year or two later, I found further south, on the Rumpa Hills, *Lindsaya ensifolia* and *Nephrodium pteroides* with mostly the same other species as the above list. Mahendragiri lies at about 19 degrees North latitude and 84½ degrees East longitude and its slightly more southern latitude accounts for the presence of such otherwise wholly southern species as *Pellœa concolor*. It is noticeable that we did not find *Osmunda regalis* or the two stream-loving *Nephrodia*. Possibly, the time of year, (March) when it is hot and dry on the East Coast, was against us.

J. S. GAMBLE.

Obituary—Mr. F. C. Henvey.

The news of the sad accident at Jalpaiguri which resulted in the death of a promising and popular young Forest Officer, Mr. Henvey, reached us just too late for our January number which had gone to Press already. We might even then have found means to give an account of it, but have been waiting for a promised report giving the details. As that report has not yet reached us, we cannot do better than republish the following from the *Englishman* :—

Jalpaiguri, *January* 6.—As the enquiry into the late lamentable accident up here has been held, and Mr. Shillingford entirely exonerated from all blame, and as there are still various versions of the story going round, I think I should tell you briefly how it all occurred.

Mr. Henvey and Mr. S. J. Shillingford were spending the night in a tent near the forest (Wednesday night, 9th December): shortly before midnight some Paharias came to tell them that the rogue elephant was feeding in some *dhan khets* some ½ to ¾ of a mile away. Although Mr. Shillingford tried to dissuade Mr. Henvey from going, he insisted, and at last both went, and as a matter of fact, saw the elephant feeding in a "tongue" of khet, on the further side of which was heavy forest (I have personally examined the place,) and on the side where they were standing there was a high bank covered with jungle and the land above this had a little cultivation, a good deal of sun grass and some jungle. There are two well beaten tracks leading up the bank from the khets, some 120 yards apart—one leading up to a village, and the other (the northern one) to the waste land. Mr. Henvey wanted to stalk the elephant in the khets, but Mr. Shillingford absolutely refused to allow him to do so. The natives suggested that they should go with torches to the forest side of the elephant and drive him up towards the bank, when he would certainly take one of the two tracks, as he had done before when driven in the same way. Mr. Shillingford agreed to this, and posted Mr. Henvey at the southern or village track, and himself, at the northern, thus standing 120 yards apart with their backs to each other. The natives did as they had promised. Mr. Shillingford saw the elephant come towards him, and disappear into the deep shadow at the foot of his track. Shortly afterwards there was a rustling and movement of the jungle by the track which Mr. Shillingford and the natives naturally thought was the elephant. The natives whispered "Fire, fire!" and at last began to bolt, Mr. Shillingford himself retiring a few paces. As the movement came nearer, at last in the excitement he fired, and almost immediately heard a European cry out, "My God!" and running down found that he had shot poor young Henvey in the thigh.

Mr. Henvey, notwithstanding the remonstrances of the natives, who absolutely refused to go with him, had gone alone down his track, wandered along the *dhan khets*, passing, we must suppose, close to the elephant, and was making his way up to Mr. Shillingford's track when the accident occurred.

Everything was done that was possible to stop the bleeding. He was put on a plank stretcher and carried to the tent, while after infinite trouble and large promises men were sent off to the neighbouring gardens and the European doctors. Two native doctors were soon on the spot. Mr. Macgillycuddy, of Sathkhya, went down with coolies, etc., and Mr. Henvey was carried to that garden. The European doctors who lived some miles away were on the spot by eight, but even then the bleeding had gone on so long that the case was nearly hopeless. Mr. Henvey got weaker, and quietly passed away at 12-40 P. M. an Thursday, just twelve hours after the accident, conscious almost to the last. It is gratifying to know that he repeatedly assured Mr. Shillingford that the fault lay with him in leaving his place without waving.

The poor fellow's remains were interred in the Planters' Cemetery at Rangamatti on the 11th, Friday, and were followed to the grave by nearly fifty Europeans.

The Cemetery is in a corner of the Ramgamatti Garden, walled in and kept in good order by the Europeans living near. I may here mention that neither of the gentlemen had ever been in the day time to the place where the accident occurred.

We are glad to be able to add to the above sad account the following extracts from a letter from Mr. Dansey, Conservator of Forests in Bengal.

Henvey joined the Service in Jaunary 1891, passed the Higher Standard in Hindustani in April and was about to appear for oral Examination in Law and Land Revenue. In the written test he had obtained very good marks. He was only 21 years old and did not look so much, not that he was at all puny, but because he was one of those rosy, smooth-faced youngsters. He was in every respect a nice young fellow, nice-looking, well mannered, fond of society and social pleasures, yet withal well up in his profession, industrious and promising well. He was also a manly young fellow, good at tennis and anxious to distinguish himself in all manly exercises, particularly so with his gun. In him, the Department has experienced a more than usually severe loss. Personally, I had only met him on a few occasions, but the impression he had made on me was such that the news of his death come upon me as a great shock.

II. CORRESPONDENCE.

A Forest Department 'Blazer.'

DEAR SIR,

A short time ago I wrote to you suggesting a Foresters' "Blazer" and you were good enough to agree and also made what I think a good suggestion for the colors themselves, *viz.* dark blue with a red border and an I. F. S monogram surmounted by a crown on the pocket. Presuming this pattern to be accepted there will still be a variety in the monogram, the breadth of edging or the tones of the colors themselves unless either there is some firm appointed to make these "blazers" (*e. g.* Harry Clark & Co. at Mussoorie) or the above points are somehow clearly described in the "Indian Forester." Perhaps also it would be as well in some way to ascertain whether a sufficient number of officers cared for the idea before *fixing* this as *the* "blazer" of the Department. Remains the question what grades should have the right to wear the coat or rather, the colors, for I presume the usual adjuncts of tie, cap, and so forth, would be obtainable if wanted.

Yours truly,
T.

Note.—Some objections having been raised to the use of the letters I. F. S. (Imperial Forest School) by the Dehra Dún students, because the same letters may stand for other things, the School will probably alter their badge to D. D. F. S.

Hon. Ed.

False Quantities in Botanical Names.

SIR,

I should like to bring to your notice an expression in M. Mathieu's "Flore Forestière" which is capable of giving a wrong idea.

Speaking of maples, he says :—

"Le nom d' acer (fort), fait, dit-on, allusion à la qualité du bois des érables." (The name Acer, strong, given to maples is said to allude to the quality of the wood of the maple.)

Now the word ăcer, a maple, has no connection with ācer, strong, as the school Latin Primer tries to explain in its line :

Est ăcer in sylvis: Equus ācer Olympia vincit.

The maple exists in woods : the strong horse wins the Gymkhana!

There are words that are homographs in all languages, such as the word "gallant" in English; with the accents different, the meanings are different.

A. W. LUSHINGTON.

The Thana Working Plans.

SIR,

In various recent articles in the Indian Forester we have all observed with wonder and awe numerous references made to the Thana Working Plans, with its 300 odd Working Circles, and I am sure most of us are now on the tip-top of expectation to hear more of this marvellous document.

For my part I should especially like to know how it is going to work with regard to the preparation of Code Forms, Nos. 23 and 36, as the work which such a complicated arrangement will involve will be enormous.

In the Division of which I have the honour to hold charge, a Working Plan's Officer has saddled us with 23 Working Circles, regarding which I was under the impression I had a certain substantial cause of complaint but on hearing of the three hundred and one Working Circles for the Thana Working Plans, I have now decided to retire to the most obscure back seat.

The very idea of such a complication of Working Circles is to me simply appalling, and is sufficient, I should think, to cause the Divisional Clerks to desert "*en masse*" and the Divisional Officer himself to apply for sick leave, or an immediate transfer.

A DIVISIONAL OFFICER.

Note.—We are glad to inform our correspondent that he will not have to waitvery long for an account of the Working Plans.

Hon. Ed.

III. OFFICIAL PAPERS & INTELLIGENCE.

Review of the Report of the Imperial Forest School for 1890-91.

At the beginning of the year there were 80 students attending the School: seven left for various reasons, and three, having obtained certificates after a special examination, were posted to their Provinces; so that only 70 were in attendance throughout the year. Of these, 39 were in Government employ, 16 were deputed from Native States, and the remaining 15 were private students.

During the year, 26 students gained the certificate of Forestry by the higher standard. Two of these obtained the certificate as the result of special examinations, which were held in the interest of urgent provincial requirements, and at the request of a Local Government, and 24 in the final open examination, held at

the end of the course and for the first time supervised by the Board of Control. Three certificates with honours were granted, to Upendranath Kanjilal of Assam, and to B. Hira Singh and C. Appaya, both of Mysore. Twelve students received the certificate of Forestry by the lower standard; one in consequence of a special examination; three who failed in the examination for the higher standard by less than 10 per cent.; and eight at the final open examination for the lower degree. One student obtained the lower certificate with honours.

The Governor-General in Council approves of the proposal made by the Board of Control that in future the entrance examination for the Forest School should be held at convenient educational centres under the supervision of officers of the Educational Department. His Excellency in Council requests that Local Governments will give practical effect to the arrangement laid down in the alteration of the school prospectus in regard to this matter.

The Resolution of the Board of Control in regard to the standard of instruction to be adopted, the subjects to be taught, the order to be followed in the instruction, the courses of instruction and sylabuses of the courses, the teaching by Divisional Officers, and the time-table of studies, is also approved of by the Government of India.

The Board of Control supports the system of periodic examinations and of according marks, which are to be counted at the final examination and the Government of India accept this proposal for the present, subject to a future discussion of the question.

The proposals regarding the final examinations are accepted; but the degree of prominence to be given to each subject at these tests should be further discussed with the view of giving a preponderating importance to Sylviculture, which, under the present proposals, has been placed on a par with Botany. The Government of India also approve of the proposals made regarding the percentage of marks required in order to obtain certificates.

It is observed that a "certificate with honours" will not in future be awarded to any student who fails to obtain half marks in any subject. This is a very proper condition, but the Government of India further desire that the fact of a candidate having passed with honours in subsidiary subjects only should not be entered on the school certificates. It is noticed that during the last examination every passed student has gained honours in one or more subjects, and the Government of India desire to draw the attention of the Board of Control to the fact that honours cease to be the distinction they are intended to be, if they can be too easily gained.

The Governor-General in Council is pleased to sanction the expenditure of a sum of Rs. 1,000, during the next two years, for

the purpose of completing the stock of books in the school library. As regards the preparation of manuals for the use of students, he will be prepared to take into consideration any definite proposals which may be submitted by the Board of Control.

The Government of India acknowledge the necessity of supplying additional quarters for students, and the proposal made by the Inspector-General of Forests, to add a general mess room for students to the new block of buildings, will receive due consideration. The removal of the present range of servants' quarters is desirable for sanitary reasons ; and the Government of the North-Western Provinces and Oudh, will be addressed with the view of obtaining a site further removed from the main school-block. The proposal to erect a special hospital and dispensary will also be taken into consideration.

Articles on forest products for the Board of Trade Journal.

The following letter has been circulated to the Conservators of Forests by the Inspector-General.

Her Majesty's Secretary of State has expressed a wish that the semi-commercial Departments of the Government of India should, from time to time, collate and prepare for insertion in the Board of Trade Journal, items of intelligence connected with Indian trade and industries, which would be of general interest to the mercantile community in the west. Similar information is likely to be required for the Imperial Institute.

I am convinced that the export trade in forest produce can be largely developed, and that there are many products in our forests the utility of which is as yet unknown, and others in regard to which there is insufficient information with reference to the quantity obtainable and the method and cost of collection. Original enquiries, research and experiments will be necessary to meet our purposes in respect to those articles which it is desirable to bring to public notice, and in this respect I intend shortly to issue a separate Circular soliciting your assistance. But in the meantime I would propose that we should collect and compile information which is already obtainable.

It is desirable that subjects should be taken *seriatim*; and the first series of articles might comprise the history of the sea-borne export trade in timber; the present state of this trade; a forecast of a possible development, as regards species already in the general market; and proposals concerning other kinds which have special qualities and are found in quantities sufficient for the development of a lucrative trade.

May I ask you, with the permission of the Local Government, to favour me, as early as possible, with all the information you can collect as regards the points mentioned above. I would suggest that the subject should be worked up by you in conjunction with one or two specially selected officers (whose names would be duly mentioned in connection with the article), for it is desirable to obtainthe information in a well-digested and thoroughly reliable form.

It is my intention to have these articles published if possible in the first instance in the *Indian Forester*, sending copies to the India Office for the use of the Board of Trade Journal and for the Council of the Indian Section of the Imperial Institute.

IV. REVIEWS.

General Reviews.

ANNUAL REPORT OF THE BOTANICAL AND AFFORSESTATION DEPARTMENT IN HONGKONG FOR 1890.

This Report, just received, does not contain very much of interest, but at any rate shews that the Hongkong authorities are working well to cover with tree growth as much as possible of available land on the island. The chief tree used is the *Pinus sinensis*, and the area of plantation is, we know, considerable. During 1890, 450 acres were planted and if we assume that a similar area was done in each of the 11 years since planting began, it would give 4,950 acres as the total area already planted up. Besides *Pinus sinensis*, of which 5,16,851 plants were put down, a large number of *Cryptomeria*, *Tristania conferta* and other trees were also planted. The Superintendent expresses the wish that some less formal tree than the Pine could be found and very likely an admixture of broadleaved kinds would be useful in mitigating the effects of the fires, which seem to be sometimes very serious. We quote the following account of them and their causes:

" Fires were exceptionally numerous and the destruction of ' trees by them was greater than in any previous year, in fact the ' reported fires were more numerous than the total number of ' fires recorded for the previous 10 years. The number of fires ' recorded in 1890 is 64. After my return from Japan I visited ' the scenes of fires where trees had been destroyed or damaged, ' and made a rough estimate of the quantity destroyed, the total ' number of which is 107,000, varying in size from 1 foot up to ' 8 feet high. On Mount Davis about 49,000, and on Mount

'Kellet 47,000 trees were destroyed, the remainder, 11,000, were 'in numerous other places scattered over the island. Although 'it is impossible to detect the orginators of the fires, except very 'rarely indeed, there is no doubt whatever that the system of 'ancestral worshipping at tombs by the natives is the main, or 'almost exclusive, cause of these fires, no care whatever, apparent-'ly, being exercised to prevent the fire used from igniting the 'grass. The large burial places on Mounts Kellet and Davis 'were the reason of the exceptionally heavy losses on those hills, 'the smaller losses being also caused by the existence of isolated 'graves in smaller cemeteries near to villages. Nearly all the 'fires took place in October when the autumn ancestral worship 'takes place, and the exceptionally numerous and extensive fires 'were the result of the very combustible condition of the low 'vegetation brought about by the excessively dry weather in 'September and October.

'As remedial measures for the future, I propose, in addition 'to the ordinary precautions adopted of stationing men in the 'vicinity of burial grounds all over the island, to extinguish fires 'which may occur at the spring and autumn tomb ceremonies, to 'post during those seasons notices cautioning the people to 'exercise care in the use of crackers, candles, &c., and to increase 'the number and extent of fire barriers in plantations near large 'cemeteries, so that the plantations will be divided up into 'smaller blocks to which fires that may arise within them may be 'confined. Nothing connected with the origin of grass fires or 'of objects to be gained by them is known which might occasion 'any suspicion that they may have been acts of incendiarism."

PROGRESS REPORT OF FOREST ADMINISTRATION IN JODHPUR FOR 1890-91.

The *Progress Report of Forest Administration in Jodhpur State for 1890-91*, has reached us from the Superintendent, Lala Daulat Ram Bimbhat. The area of forests now comes to 290 square miles. They are managed under a set of Rules which are given in the Appendix to the Report and which are published as 'durbar orders.' These Rules constitute three classes of forest, *viz:* 'Protected,' 'Open,' and 'Independent.' The protected forests are closed to the public in the matters of felling timber, and grazing except at certain times of the year; the open forests are open to certain villages having prescriptive rights in them; and timber is cut under departmental superintendence, dry-wood and grazing being free; and the independent forests consist of a block made over to 'Ganerao' in which he levies his own fees. We are not told who Ganerao is. Nor is it clear what the Rules contemplate as prescriptive rights,' but we think the term rather a dangerous one

to use as likely to bind future rulers and hamper future management. The rest of the Rules relates to the privileges allotted to different classes of villages and to the rates payable for forest produce.

The most interesting chapter of the Report is that which refers to 'fire protection,' and the success of the measures taken is gauged by the fact of only 12 square miles out of 298 having been burnt. The fires are said to have mostly come from the Oodeypore territory where fire raged everywhere unchecked. In one fire a sad accident occurred, recalling a recent similar report from France, for in a fire on the Oodeypore boundary four women and a man were surrounded and burnt to death.

We note with interest that the pressing of grass for export as hay has been commenced. A 'Boomer Hay Press' purchased from Burn & Co., Calcutta, for Rs. 1,250, was used, and bales of convenient size turned out, but we are not given any information regarding the financial success of the work.

The revenue of the year came to Rs. 20,918 and the expenditure Rs. 10,692 which seems good, considering the large amount of produce given away free.

PROGRESS REPORT OF FOREST CONSERVANCY IN CEYLON FOR 1890.

The *Progress Report of Forest Conservancy in Ceylon for 1890*, has reached us from the Acting Conservator Mr. A. F. Broun. If contains much of interest, but shews that forest matters are still rather unsettled in the island. The area of Forest of all classes on 31st December, 1890, was 1782 square miles, made up of—

	Sq. miles.
Reserved Forest	40
Proposed Reserved Forest ...	130
Other Crown Forests ...	1,612

and this area is managed by a Conservator, a Deputy-Conservator, 9 Assistant Conservators, a Superintendent of Railway Fuel Supply and 4 Foresters. Their rates of pay are not given, except that we are told that the Senior Assistant-Conservator gets Rs. 4,000 per annum, the next Rs. 3,500 and most of the rest Rs. 3,000.

The Ceylon Forest Ordinance must indeed be rather a curious one, for the Conservator says in para. 25 :—" A revision of the 'Forest Ordinance is most urgently required. A law which 'makes Forest Officers public servants so as to give them the 'protection of the Penal Code, and yet excludes from its pro-'visions Forest Rangers, Guards and Watchers who are the pro-'tective Officers of the forests, and therefore require protection 'most, and a law which does not allow Forest Officers to fell a

'tree without permission of the Government Agent, while the Office Assistant, who has perhaps never set his foot within a 'forest can do so, must require considerable amendment."

The descriptions of the forests and their reproduction are rather unintelligible to us, from the use of none but native names. We have not always at hand libraries of reference to enlighten us, so that such names as 'hulanhik,' 'na,' 'wewarana' and 'mihiriya' convey no information. It is a pity that the scientific names could not have been added in brackets for the benefit of the uninitiated. We note, however, that, as in the Nilgiris, the Eucalypti, Australian Wattles and some Conifers are being successfully grown in the hills round Newara Ellia and that teak and mahogany are being planted in some places. The Mahogany in the Jaffna District in the extreme north seems to grow well, the oldest tree planted in 1843 and 47 years old shewing a mean girth of 8 ft. 7 inches, which is rather surprising as we always thought Jaffna was a very dry place. But there cannot be much doubt that Mahogany likes being near the sea, as is shewn by the fine trees in Calcutta and Madras.

The results of the years' finance were :—

Revenue	...	...	Rs. 5,10,045
Expenditure	...	...	,, 4,21,517
	Surplus	..	,, 88,528

which seems good.

INDIAN MUSEUM NOTES, VOL. II PARTS 1 TO 4.

Indian Museum Notes. Vol. II. parts 1 to 4 contain, as usual, much most excellent work by Mr. E. C. Cotes on the insects destructive to crops both agricultural and forest. In Part I. there is an account of the *Stromatium asperulum*, a cerambycid beetle which attacks Teak in the Kulsi plantations in Assam and is probably the insect described by Mr. A. G. Mein in our pages in 1879. The small moth whose larvæ are so destructive to Toon trees in Dehra Dun is identified as *Magiria robusta.* A weevil discovered by Mr. C. Gilbert Rogers in the seeds of *Strobilanthes pectinatus* at Darjeeling is described as a new species *Apion Strobilanthi ;* and the larva found by the same officer on the leaves of the big Darjeeling oaks, *Quercus lamellosa* and *pachyphylla*, proves to be also a weevil though it cannot yet be very precisely identified. There is an interesting account of the American blight, which after having been reported as doing serious harm to apple trees in South India, has now appeared in Mussoorie. It is an Aphid named *Schizoneura lanigera.* And there is a full account of the moth which has been so destructive to Sal trees in the Darjeeling Terai and is now identified as *Eumeta Sikkima.* In Part 3 is an article on 'white

insect wax' made by an insect *(Ceroplastes ceriferus)* which has long been cultivated in China and which has recently been discovered by Mr. W. P. Thomas in the Hoshangabad District of the Central Provinces feeding on saplings of *Terminalia tomentosa* and *Chebula* and *Buchanania latifolia*; and in Chota Nagpore by Mr. Peppé on the mango and *Terminalia Arjuna*. Part 2 gives an account of the wild silk-producing insects of India with a beautiful series of photo-etchings of the different species. These are intended as a supplement to a paper in the 1st Volume of the 'Notes' and we recommend our readers to study them and help in defining their limits and the plants upon which they feed. Part 4 gives an account of the different species of Locust that have, at one time or another, committed havoc in the fields of various parts of India; and shows that there are several species and that it is mistake to imagine that all the swarms belong to one and the same kind.

REPORT ON THE DEPARTMENT OF LAND RECORDS AND AGRICULTURE, BURMA, FOR 1890-91.

The *Report on the Department of Land Records and Agriculture, Burma, for 1890-91* contains little or nothing of special Forest interest, though we regret to see that the question of the provision of permanent grazing grounds is subject to very frequent fluctuations. It is clearly a waste of energy and trouble for one District Officer to set apart thousands of acres of land as grazing ground; while his successor finds it more profitable to throw them open for cultivation, and yet this apparently is what is going on. We wish that the idea which the Director of Agriculture has of the grazing question in the North-Western Provinces were really true. He says:—"In the parts of India which 'are most highly cultivated (*e. g.* the North-Western Provinces) 'people cannot keep many cattle, but are compelled to stall-feed 'those they do keep, and the cattle though fewer in numbers are 'therefore better cared for and are less liable to disease." He would, we think, change his opinion were he to visit with us some of the southern slopes of the Siwaliks of the Saharunpore District a month or two hence, and see the sort of cattle it is that graze and how much stall-feeding they get. And we fancy that all the Sub-Himalayan Districts are in much the same case. The country wants not only a large increase in stall-feeding but a larger growth of fodder crops.

Report on the Canal Plantations

for the year ending 31st March, 1890. (P. W. D. Irrigation Branch, N.-W. Provinces.)

The Canal Plantations in the North-Western Provinces would form an average Forest Division from certain points of view. They have an aggregate area of 36,037 acres, a gross revenue of Rs. 1,88,196, and an expenditure of Rs, 54,772. The most noteworthy point about them is that they have an excellent market for the produce, hence the high average net revenue per acre of three and a half rupees.

The trees on these canals are counted every year, and in many cases they are numbered and their dimensions, and, we believe, value, entered in a register. What constitutes a tree we are not told, *i. e.* what is the lowest girth recorded, but as given in the Report we find that the number of trees at the end of 1888-89 was 1,858,612; that 186,715 trees were felled during the year, and that at the end of 1889-90, there were 1,771,263 still remaining; this shews on the whole some 99,366 trees entered the plantation, either by being planted from the nurseries, or by growing up above whatever is the minimum size adopted for the definition of a tree. We read in the Resolution "The figures show that the re-stocking of the plantations is not 'keeping pace with the felling, and the matter should receive the 'careful attention of all officers concerned."

Expenditure is incurred on the five major works—the Betwa, Upper Ganges, Lower Ganges, Agra and Eastern Jumna Canals,—on fencing, sowing and planting, watering, clearing and thinning, and conservancy. We gather from the Report, that there are 1269 miles of fencing, but we are not told in what it consists—probably in wire—nor what it costs per mile.

On the Upper Ganges Canal, a sum of Rs. 4,475 was expended in eradicating the jungle along the Canal banks, as it tended to harbour pigs which damaged the neighbouring crops. The Superintending Engineer of the Lower Ganges Canal writes as follows:—

"Hitherto the Bhognipur Division is the only one in which 'special measures have been taken to clear jungle with a view to the 'extermination of wild pig. In the cold weather of 1889-90 the 'effect of the jungle clearance in the few miles above Shikohabad 'was very marked in the way of reducing the number of wild pig 'to be seen on the canal banks; but in April and May the pig 'returned again and might have been seen any evening in '"sounders" of 10 and 12 in low cover close to the water's edge. 'There is usually sufficient cover in the fields outside to shelter the 'pig when that on the canal bank is cleared, and I doubt if any 'measures we can take short of shooting females will exterminate 'the pig. It is probable that if a fraction of the money spent on

'special jungle clearance on the Bhognipur Branch had been 'devoted to the purchase of ammunition for shooting the pig, the 'practical results would have been much better.

'On the Bhognipur Branch between July 1889, and April '1890, the following sums were spent on jungle clearance :—

			Rs.
'1st sub-division	...	...	2,798
'2nd ditto	...	...	1,837
	Total	...	3,837

'It may be taken that of this sum about Rs. 3,000 were spent 'on special clearance over and above what would have been ex-'pended on ordinary clearance of canal banks and berms. The 'whole of the branch canal from miles 17 to 106 has been cleared. 'During the canal closure, 1890, several miles of the berms have 'been cut, and the earth heaped up above water level on the 'remaining berm. This operation should reduce the growth of '*narkul* to a large extent."

It is probable that these operations which involve the uprooting of grasses and other plants will favor the growth of natural seedlings. Clearances under special grants were also made along some of the other canals. But the cost of these clearances is very heavy, and they will have to be renewed every second or third year. However, the revenue and expenditure of the Irrigation Department in the North-West are so enormous that a few thousands expended on any special work are but as a drop in the ocean.

We should like to know how many trained Forest Rangers they have, and whether it would not be a good policy for them to send three or four promising young men to the Dehra Dún Forest School every year to learn their profession. No doubt the plan has been mooted before, but there is no harm in again drawing attention to it.

S.

IV. SHIKAR.

Another Last Tiger.

The sun was already low in the horizon on a January evening when the writer, followed by a shikari carrying a blanket and a spare gun, proceeded cautiously along a cattle track leading through scrub jungle to the spot where lay the remains of a buffalo, said to have been killed the night before by a large tigress. Not much time was lost in climbing into the "*Machan*,"

nor was much needed, for it seemed even in daylight to be unnecessarily low and as the evening advanced it appeared to become much lower ! After the quiet departure of the shikari an hour passed in silence uninterrupted save by the noisy crows who closely investigated the kill but declined to alight and taste, a circumstance held to show that the tiger had not yet given up all claim to his supper ; then sunset, the exit of the lowing cattle from the forest, the voices of the passing cowherds conversing with the watchers in the distant fields, followed by dusk and a feeling of intense solitude. The buffalo lay under a small tree to the left of an open space, once one of the main entrances to a fort now in ruins ; on each side of the "*machan*" the ditch and mound of this fort overgrown with dense jungle were still describable in the evening gloom, for the tree bearing the "*Machan*" grew almost in the ditch and the opposite mound was only a few feet below the level of the ready rifle. The moment for the arrival of the tigress if she intended to pay an evening visit had now come, and that she was in the near vicinity was suddenly proved by the scolding of a solitary monkey who had taken up his quarters for the night not a hundred yards distant ; and sure enough after a couple of minutes which seemed an age, a shadowy form was visible to the strained sight but too distant to make it worth while to risk firing when the rifle sights were useless in the darkness. Another few minutes passed and then suddenly, as out of the earth, the outline of a tiger was seen advancing to the kill and only a few feet distant from the "*Machan*." As the rifle was slowly raised, the tigress, evidently suspicious turned her head and looked full at her fate. It was the last I saw of her that evening, the report of the rifle was followed by two angry roars and through the smoke it seemed as if the beast was intent on revenge, for she appeared to rush in the direction of the flash and then suddenly to disappear. It must have been full twenty minutes before the cautious whistle of the Shikari bringing up an elephant was heard, and so home to the cosiness of a camp fire and dinner table, where the chances of to-morrow's search were fully discussed. The next morning early, three experienced trackers covered by the rifles of two howdahs were busy examining the faint marks on the hard soil and translating the story of the previous evening. One or two short hairs and a slight scratch in the ground showed that the tiger had been hit, had fallen or lurched evidently to one side and had then made off at a run into the ditch to the right of the tree. Another 20 yards, covered by inches by the trackers, and blood was found, and then to these men, whose keenness of sight was only equalled by their courage, the work became easy. For hours the tigress was followed over the worst possible country, precipitous ravines, thorny scrub, and dense forest, till a warning growl proclaiming her vicinity, each tracker was in an instant 15 feet up a tree whilst the howdahs eagerly advanced to the prey. But the end was not to be so soon. The

tigress was apparently too sick either to fight or to run far, at every fifty yards she lay down waiting only to move on as the trackers approached, and midday had passed before it was decided to abandon the trail and on the morrow adopt the plan of sending guns ahead to intercept her anticipated path. On the morning of the third day the track was again taken up and it was soon evident that the tiger had remained all night where she had been left the day before; she still refused to face the elephants but by dint of careful driving she was forced into open country where for the first time she showed herself in charging the advance guard with angry roars. Having thus asserted her intention to accept battle, she took up her quarters under impenetrable thorns where she succumbed after repeated attempts to charge and damage her enemies. The tigress was a young animal about 9 feet long with a winter coat in splendid condition. The bullet fired from the "*machan*" from a ·500 express rifle had struck on top of the left shoulder but had injured no vital part, once more proving my theory that a hollow fronted bullet in the shoulder of a large tiger does no immediate vital damage, and that the middle of the body is the spot to aim at if indeed aims can be taken. To me this experience of tracking over difficult country was new and specially interesting. I was filled with astonishment and admiration at the coolness and sagacity of the trackers who followed the tigress from the kill to her death with the keenness and fidelity of bloodhounds, and I felt that from start to finish I had enjoyed more true sport than if I had killed half a dozen tigers with a line of elephants.

S. E. W.

VI. EXTRACTS, NOTES AND QUERIES.

Collecting Mosses.

Mr. Duthie is collecting materials with a view to compiling a list of mosses known to occur in North-Western and Central India, and would be glad to receive specimens from any persons interested in the subject. Every kind of moss, more especially fruiting specimens, would be acceptable. After gathering the specimens, all that is required in the first instance is to lightly press them between sheets of absorbent paper in order to remove the moisture, and a ticket should be placed with each kind stating the locality where, and the date when, collected, and the parcel may then be forwarded by sample post bearing, to the Director, Botanical Department, N. India, Saharunpur. Any one wishing to receive the names of specimens contributed by them should retain a duplicate set numbered in correspondence with those sent to Saharanpur.

The India Forest Service and its Founders.

The permanent and progressive improvement of wood cultivation in Scotland will be secured only by the founding at Edinburgh of such a national school of forestry as the Royal Scottish Arboricultural Society is seeking to accomplish. It is high time that Scotland should do for itself what its sons have effected for many other countries. In the whole annals of economic progress and commercial development, it may be questioned if anything quite so remarkable can be cited as the beginning, the growth, and the results of scientific or State forestry in British India during one generation. In thirty years the India Forest Department has been called into existence, has been organised under experts, and has created for the Government a net annual revenue larger than that of France, and soon certain to equal if not surpass that of Prussia. For centuries France and Prussia have enjoyed regular and systematic forest management, seen in well-stocked woods, with a gradation of ages, which yield large annual crops of timber and other forest produce. The annual surplus raised from the French forests is about three-quarters of a million sterling, and that of Prussia is under a million sterling. Even as far back as 1889-90, two years ago, the gross receipts of the forests of India were £1,486,303, and the net revenue £706,268. Upper Burma has been added, and in a few years even Prussia will be distanced by India.

Such a result is due to two Scotsmen—the first (and last) Marquis of Dalhousie and Dr. Cleghorn of Stravithie, long a distinguished member of the Madras Medical Service, who is still spared to us. As a poor Scots peer, the great Lord Dalhousie knew well the value of ancestral trees. Next to roads, forests were the first object of his care in every new province that he added to the Empire. The second Sikh War revealed to his keen eyes the vast plains of the Panjab, "wholly destitute of forest trees," to use his own official language. Immediately, the the order went forth some forty years ago that every district officer should plant and induce the landlords and peasantry to plant trees, so that now the face of the hot plains has been altered, the climate has been ameliorated, and the land has a fine water supply. The next conquest forced on that Governor-General was Pegu. That Province also, soon to be doubled up with Arakan Tenasserim as British Burma, he visited, and its stores of teak and sal timber attracted him. In the Punjab it was the people whom he directly benefited; in Burma he saw the necessity of organising a State Forest Department if the teak treasures were to be reserved and extended so as to meet profitably the necessities of the Empire. For the first Conservator of Forests in Pegu, and ultimately the first Inspector-General of Forests in all India, he went to the University of Bonn, and there found the man he wanted in its Professor of Botany, the son of the great writer on

Greek philosophy, and himself now the better known Sir Dietrich Brandis, Ph. D. That was in the year 1856. But for some time before that Dr. Cleghorn, when marching about with his sepoy regiment, had seen and represented to Government the waste caused by the *Roomri* cultivation, under which the peasants burned down whole forest tracts to form a fertile soil for their sporadic crops. He induced the authorities in South India to listen to him and to adopt his plans. Lord Dalhousie at once appointed him Conservator of Forests in Madras, and afterwards in the Punjab, and there he brought about such results that the Government of India publicly described him as "the founder of forest conservancy," a title the justice of which Inspector-General Brandis was the first to recognize. Scottish ideas and Prussian experience have combined to produce the growing net revenue of three quarters of a million sterling a year, and the far greater advantages to the country and the people, some of which we may describe.

The Forest Service of India was first organised in 1864. The superior officers are selected for it by competition in this country, and are trained professionally with those for the Public Works Department at Cooper's Hill College, or in Germany or in France. The subordinate native officials are specially educated at the Forest School, near Dehra Doon, in the lower Himalayas. It is certainly not creditable to the British Government that its forest officer should be sent to foreign countries for that theoretical and practical instruction which could be so easily and efficiently centralised at Edinburgh, to the advantage not only of India, but of the whole country. In India the Forest Service is so organised that each of the great provinces is under at least one chief officer, styled conservator. Burma, Bombay, and North-West India have three each and Madras has two. Each conservatorship, or forest circle, is divided under deputies or assistants, and each of these divisions is sub-divided into ranges. It is found that an area of 20,000 acres, or 30 square miles, is as much as can be managed by one forest ranger. The life of these officials, while sometimes full of hardship and fever risk, is delightful to the man who knows the language well enough to like the natives, and who is fond of sport. The late Captain Forsyth, son of an Aberdeenshire manse, who too early fell a victim to exposure, produced the most charming record of a cultured forest officer's life in his "Highlands of Central India."

Under careful legislation, the system of Indian Forestry works with little immediate hardship to the peasantry, and with ultimate great gain to them especially in the time of such drought as that which is still desolating large tracts of Madras. Having surveyed all the forest resources of his circle which are not strictly private property, the conservator selects and marks off as reserves an area sufficient to supply to the natives timber, firewood, bamboos, canes, and other produce, and to the State such articles

of foreign demand as teak, sandalwood, and rubber. Although the State is almost the universal landlord, it buys out or compromises private rights in the reserves. If the Forest Service had done nothing else than stop the yearly fires which used to devastate the woods, and supply an adequate number of seed-bearing trees so as to secure the regular reproduction of the more precious timber, it would have justified its existence. In some cases, by leases, the Government have managed to keep in existence, and to improve, limited areas of private forest; but these have been too generally exhausted by their thoughtless native proprietors, whom Lord Dalhousie, in the famous Minute of 1856, reviewing his eight years' administration, described as "improvident and ignorant petty potentates."

In the last twenty-seven years, since the Forest Service was organised all over India, an area of no less than 60,000 square miles has been thus reserved and demarcated. Every year this is being increased at the average rate of 2,000 square miles and the whole will certainly rise to at least 80,000 square miles, yielding a revenue of considerably more than a million sterling a year. When Upper Burma was brought by Lord Dufferin under the Empire, it was found that nearly all the best teak forests were worked under leases from King Theebaw. These were investigated and have been equitably settled. The rapid exploration of the few officers who could be spared has revealed some 9,000 square miles of splendid forest, fast being cleared by the most wasteful felling and fires. Of these, some 1,100 square miles, chiefly under teak, have been reserved; a more limited area, very rich in cutch and teak has been found. In most of the leased forests great numbers of trees have been girdled to be worked out, and everywhere reproduction is being satisfactorily aided on a proper system. In the last year for which we have figures, 1890-91, the total outturn of teak rose from 195,405 tons to 260,074 tons; half of the latter was extracted by the Bombay Burma Corporation alone, so the export of teak from Burma by sea rose from 156,434 tons to 184,431 tons. But the natural result of this was that the price of teak in the English market fell from £13 to £9 per ton.

Only half a century age, when the East India Company had its own navy, the famous dockyard of Bombay, with its Parsee shipwrights, used the teak of Western India to turn out what were then magnificent ships. Notwithstanding the now general use of iron in shipbuilding, it is quite possible that the time may come when the natives of India will use their own forests from which to construct their own coasting marine. The British Government is creating for them a rich source of wealth; but valuable as are the teak and other great timber trees of the Indian forests, we shall see that their humbler products may be so utilized as to prove even greater means of prosperity and happiness to the people.—*(Scotsman.)*

Casuarinas.

A few of these elegant Australian shrubs are grown in our conservatories, and some even form part of the repertory of the table-decorator. Their chief interest, however, is botanical. M. Treub, the eminent director of the Botanic Garden at Buitenzorg, shows that the pollen-tube, instead of entering the nucellus through the micropyle, as is customary, makes its way through the chataza. On this account Dr. Treub has divided flowering plants into two divisions, viz., Porogams, including the Monocots and Dicots, and Chalazogams, comprising the Casuarinas only. The pollen-tube in some cases branches at the end, and the whole course of development of the female flower is different from that of ordinary flowering plants.—*(Gardener's Chronicle).*

Forest of Box.

Near Antkjel may be seen the remains of an old Box-tree forest. This tree is now rare even in the Caucasus ; a wood containing about 20,000 trees, ranging up to 2 feet in diameter, still stands at a higher elevation near Bsipp, but has recently been purchased by an English company for nearly one million dollars. A Box forest, says Dr. Dieck, in *Garden and Forest*, is the genuine forest of the fairy tales. " No soul can be so dull as not to feel its influence. Hardly a ray of sun can penetrate its thick roof of foliage; perpetual twilight and solemn silence reigns within it. All the trunks, all the knotted branches, all the twigs are thickly covered with long trails of moss, while the dark soil beneath bears only a rare tuft of Ferns or group of shrinking fungi. No bird's voice is heard, no insect whirs through the air; only the rustling of the tree-tops and the moaning of the wind-twisted boughs breaks the church-yard stillness of this ghostly wood."—*(ibid.)*

A curious find in a Walnut tree.

Whilst a large walnut tree, which had been purchased by Mr. C. Smith, gunsmith, Newark, from Denton Manor, was being sawn at Mr. Jas. Smith's timber yard, London Road, Newark, a curious discovery was made. The trunk was about four feet diameter, and on the saw going down the centre a hole was found about six inches long, full of quicksilver. The hole had at some ancient date been bored out, and the quicksilver inserted and plugged up. The plug, which was made of deal, was found,

and beyond it had grown in the course of time eighteen inches on either side of solid walnut. Considering the very slow growth of walnut, a tree of this dimension must have taken several hundred years to produce, and it is conjectured that the hole could not have been made less than two centuries ago. What was the object of inserting the quicksilver it is difficult to surmise. The tree stood in Denton village, close by the side of the footpath.—*(Timber Trades Journal.)*

Utilization of cut grass in Reserves.

The Collector of North Arcot has issued a most useful and timely proclamation to the ryots of the District asking them to devise means for the prevention of a recurrence next year of the great mortality among cattle. The Collector remarks that the "stalk of paddy straw in the district is almost *nil*, and owing to the failure of one monsoon and deficiency of another, it is not likely that there will anywhere be more than one wet crop this year. Again the area of wet land cropped to date is considerably less than normal. It is, therefore, certain that there will be an insufficient stock of dry fodder for next year, 1892, and unless there should be very good mango showers in April and May, and a good and early South-West Monsoon, the mortality amongst cattle is likely to be repeated." The ryots have been warned therefore to take warning by the past and to take precautions for the future. The means suggested are to cut, dry and stack the grass which grows abundantly at present in the forest reserves, and which would make excellent fodder in the hot weather. Grass is also allowed at present to be cut in all forest reserves free of charge, and permission has also been accorded to stack the dry grass in the reserves till required for use. Revenue and forest officers have been asked to afford every facility to the ryots to cut and stack the grass in the reserves. Mr. Le Fanu's example might profitably be followed in other districts.—*(Indian Agriculturist.)*

Elephant-Catching Operations.

As mentioned briefly by us before, the Government of Madras has decided to allow the Forest Department to continue its elephant-catching operations on the pit-fall system which it has been carrying on in Malabar and Coimbatore since 1884. Though the general system is the same in all cases, the number, size and arrangement of pits vary a little according to circumstances. In North Malabar, Mr. Morgan had opened 13 pits for his first venture in 1884, and these were repaired and new ones added the following year, when more extensive operations were instituted. Having examined the main elephant paths and fords, he pegged out pits 12′ by 14′ in groups of two to four according

to the lie of the ground, and these he excavated to a depth of from 12′ to 14′ refilling them to within 7 or 8 feet of the mouth with small springy branches of trees, and over these a layer of bundles of lemon grass. The pits were covered in with a light platform of split bamboos, over which came a layer of grass, and lastly, dead leaves, &c., arranged so as to resemble the surrounding ground. The earth dug out of the pits was either thrown into the nearest stream or strewn over the ground and covered with leaves, &c., to conceal it and avert suspicion. A couple of jungle men were then told off to watch the pits and make a daily report. In South Malabar there are 19 new pits in the nellikutta forest and 22 in the Karunpaya reserve, making, with 164 old ones in the recently acquired Amarampoliem forests, a total of 165. Each pit is 12 feet square at its mouth and 12 by 9 at the bottom. In South Coimbatore similar arrangements are observed. Mr. Porter has dug 21 pits in groups of three within a radius of two miles of his forest station, Mount Stuart, each 12′ by 9′ with a depth of 10′.

When an elephant is caught, the thing to be done is to get it out of the pit and removed to a kraal, *panthi*, with the least possible delay. In North Malabar there is a large *panhti* at the forest station of Begur about four miles from the pits. It is simply a huge and substantially built cage capable of holding four large elephants at a time. In South Malabar there are five kraals, and in South Coimbatore there are four, two permanent and two temporary. On capture being reported, trained elephants are at once marched to the spot, and the captive being secured by soft ropes is enabled to get out of the pits by means of grass and brushwood which are thrown in, and it is then escorted to the kraal by the decoys. Here its schooling begins. In all cases the rule is to avoid the least unnecessary severity and to train by means of kindness. Men accustomed to the work are employed, and in North Malabar, Mr. Morgan, by a judicious system of rewards in the shape of jaggery, sugarcane or other delicacies, induced the animal to perform various acts of obedience. In a couple of months the elephant is tractable enough to be taken out of the kraal and stabled in the ordinary way, well chained, of course, and in another two months it has learnt to kneel, lie down and obey the word of command. In five months' time it may be taught to drag timber after a fortnight's preliminary training at which it may be sent to work with the other elephant. In South Malabar, Mr. Hadfield makes it a rule to release all elephants, past their prime, as in his opinion, which is shared by Mr. Sanderson, such animals usually pine and die, or, if they survive the ordeal of capture and training, seldom turn out satisfactory. His treatment in the kraal is to allow abundance of fodder only and to pour water copiously over the animals four times a day, which is a great luxury, and which, he finds, not only serves to promote good health, but goes a long way toward making them docile.

Mr. Morgan estimates that the average cost of capturing and training an elephant under the system will amount to Rs. 250, the estimate being exceeded or diminished respectively according as the supervision is careless or several elephants are trained at the same time. As regards the results since 1884, 31 elephants in all have been captured, of which 17 survive. Of the casualties 4 are ascribed to neglect and the remainder to natural causes. These results appear satisfactory enough, and at any rate prove that the pit-fall system properly carried out and properly supervised is neither a cruel nor an unprofitable one. The two essential conditions for its success are carefully dug and furnished pits and daily supervision by responsible watchmen. As long as these are fulfilled there is nothing to be urged against it. Nevertheless, we trust that a careful comparison between the kheddah and pit-fall systems will be made as soon as the Mysore Government has furnished the necessary statistics. Mr. Morgan believes that if statistics could only be obtained they would prove conclusively that the mortality under the former system as now conducted in Mysore is four times greater than under the pit-fall plan. But he probably includes in his estimate the old and useless elephants which Mr. Sanderson himself kills on account of the danger they would become if turned loose again.—(*ibid*)

VII. TIMBER AND PRODUCE TRADE.

Churchill and Sim's Wood Circular.

January 1*st*, 1892.

The imports of timber into the United Kingdom during 1891 amounted to 6,760,130 loads, valued at £14,479,138. The consumption of London was 32,290,000 pieces, comprising deals, battens, boards and ends; with 196,800 loads of timber railway sleepers and spars. Of *Teak* 16,621 loads were imported. The demand for *Ebony* is increasing, £10 to £12 per ton being ruling rates. *Rosewood* and *Satinwood* are also in good demand.

VIII.—EXTRACTS FROM OFFICIAL GAZETTES.

1.—GAZETTE OF INDIA.—

14*th January*, 1892.—No. 56-F.—With reference to the Notification by the Chief Commissioner of Assam, No. 10813 G., dated the 24th ultimo, Babu Upendra Nath Kanjilal, Forest Ranger, Assam, is appointed to be an Instructor at the Forest School, Dehra Dún, under the terms of paragraph 10 (i) of the Circular Resolution of this Department, No. 18 F., dated the 29th July last, and with effect from the date on which he assumed charge of his duties.

2.—MADRAS GAZETTE.—

19*th December* 1891.—*Transfers.*—1. Ranger V. C. Doraisawmi Pillai, from North Arcot to Trichinopoly.

2. Ranger Mr. Jembunatha Sastri, from the Trichinopoly District to Salem District.

3. Ranger Mr. A. M. Clay, from Salem to North Arcot.

20*th December* 1891.—*Leave.*—Mr. W. P. Rego, Ranger, Second Class, is granted privilege leave for one month, from or after 22nd December 1891.

21*st December* 1891.—*Leave*—Forest Ranger Mr. H. Stafford, is granted two months' leave on medical certificate from the 3rd December 1891.

9*th January* 1892.—*Leave.*—The Board of Revenue (Land Revenue) has granted an extension of seven day's privilege leave, under Article 291 of the Civil Service Regulations, to Mr. J. S. Battie, District Forest Officer of Ganjam, in continuation of the fifteen days' privilege leave notified at page 1508, Part II, of the *Fort St. George Gazette*, dated 27th October 1891.

18*th, January* 1892.—No. 19.—Mr. A. W. Peet to be Second-grade Conservator of Forests (permanent).

No. 20.—Mr. J. W. Cherry to be Third-grade Conservator of Forests, (permanent).

No 21—Mr. J. W. Cherry to act, as Conservator of Forests, Second Grade, during the absence of Mr. A. W. Peet on leave or until further orders

No. 22.—Mr. E. D. M. Hooper to act as Conservator of Forests Third Grade, during the absence of Mr. J. W. Cherry on other duty, or until further orders.

The above appointments to take effect from the 21st October 1891 A.M.

18*th January* 1892.—M. Jambunada Sastri, Forest Ranger, Fourth Grade (under transfer to Salem), will be considered to have been on leave on medicial certificate, under article 369 of the Civil Service Regulations, for nine days from 23rd November 1891.

19*th January* 1892.—No. 25.—Messrs. J. L. McO'Leary and F. C. L. Cowley-Brown, Trained Forest Officers appointed by Her Majesty's Secretary of State for India, having reported their arrival in Madras on the forenoon of the 26th December 1891, are brought upon the strength of the Madras Forest Department as Assistant Conservators, Third Grade, with effect from that date, and are posted to do duty under the Examiner of Forest Accounts.

19*th January* 1892.—No. 26.—

Name.	Present grade.	Grade to which promoted.	Grade to which reverted.	Nature of promotion or reversion.	Remarks.
Mr. C. E. Brasier ..	Deputy Conservator of Forests, 4th Grade	Deputy Conservator of Forests, 3rd Grade.	..	Acting ..	From the date of Mr. Brasier's joining Tinnevelly.
Mr. F. A. Lodge ..	Acting Conservator of Forests, 3rd Grade.	..	Deputy Conservator of Forests, 4th Grade.	Do ..	

15*th January* 1892.—No. 70.—(Military Department) Colonel Campbell-Walker, Indian Staff Corps, has been permitted by the Right. Honorable the Secretary of State for India to retire from the service with effect from the 17th January 1892, subject to Her Majesty's approval.

3.—Bombay Gazette.—

4th January 1892.—No. 14.—In exercise of the power conferred by Section 4 of the Indian Forest Act No. VII of 1878, as amended by Act No V of 1890 and with reference to Government Notification No. 6548, dated 16th September 1886, published at page 805 of the *Bombay Government Gazette* of the 23rd idem, Part I, His Excellency the Governor in Council is pleased to appoint, *vice* Mr. R. T. Wingate proceeding on leave, Mr. W. D. Sheppard, C. S., to be Forest Settlement Officer for the Kánara District for the purposes set forth in Section 4, clause (*c*), and Section 34 of the said Act, and in respect of all lands in the said District up to this date notified as proposed Reserved Forests under Section 4, or as Reserved Forests under Section 34, which have not since been disforested under Section 26 and in respect of which the inquiry into rights contemplated by clause (*c*) of Section 4 of the said Act has not yet been made.

2. Under Section 16 of the said Act, His Excellency the Governor in Council is also pleased to appoint the Collector of Kánara to hear appeals from any orders passed by the said Forest Settlement Officer under Sections 10, 11, 14 or 15 of the said Act.

3. His Excellency the Governor in Council is pleased to direct that the inquiry and record in respect of the Protected Forests of the said district shall be made and prepared in the same manner and subject to the same provisions and right of appeal as in the case of Reserved Forests.

6th January 1892.—No. 43.—Mr. G A. Hight, Deputy Conservator of Forests Second Grade, and Divisional Forest Officer, Dhárwár, is allowed privilege leave of absence for three months with effect from 20th January 1892 or from such subsequent date as he may avail himself of it.

6th January 1892.—Messrs. K. B. Phadke and A. N. Master respectively delivered over and received charge of the North Sub-Division Forest Office, South Thána on the 17th December 1891, after office hours.

Messrs. L. S. Osmaston, Assistant Conservator of Forests, and G. P. Millett, Deputy Conservator of Forests, respectively delivered over and received charge of the office of the Divisional Forest Officer, North Thana, on the 16th December 1891, after office hours.

14th January 1892.—Messrs. F. Gleadow and H. Murray, Deputy Conservators, respectively delivered over and resumed charge of the Divisional Forest Office, Belgaum, on the forenoon of the 11th instant.

21st January 1892.—Messrs. K. B Phadke and W. F. D. Fisher respectively delivered over and received charge of the South Sub-Division Forest Office, South Thána, on the 5th instant, after office hours.

25th January.—No. 538.—Mr. L. S. Osmaston, Assistant Conservator of Forests, Third Grade, is promoted to the Second Grade from 15th October 1891.

5.—N.-W. PROVINCES AND OUDH GAZETTE.—

7th January, 1892.—No 44.—Mr. F. A. Leete, who has been appointed to the Forest Department by the Right Hon'ble the Secretary of State for India, and who reported his arrival at Allahabad on the 31st December 1891, to be an Assistant Conservator of Forests, 2nd grade, and to be posted to the Garhwal Forest Division of the Central Circle.

No. 48.—Mr. J. C. Tulloch, who has been appointed to the Forest Department by the Right Hon'ble the Secretary of State for India, and who reported his arrival at Allahabad on the 31st December 1891, to be an Assistant Conservator of Forests, 2nd grade, and to be posted to the Gorakhpur Forest Division of the Oudh Circle.

20th January 1892.—No. 35.—The Hon'ble the Lieutenant-Governor, and Chief Commissioner, is pleased to declare the undermentioned gentleman to have passed the Departmental Examination of Junior Officers, held on the 19th October 1891 and following days, in the subjects specified below :—

V.—FOREST OFFICER.

Vernacular.

By Higher Standard.

Babu Har Sarup, Extra Assistant Conservator.

21st January 1892.—No. 24.—In Notification No. 449, dated the 12th December 1891, notifying the date on which Mr. Lace, Deputy Conservator of Forests, assumed charge of the Bashahr Forest Division from Mr. G. G. Minniken, Deputy Conservator of Forests, for "*afternoon*" read "*forenoon.*"

Erratum.—6.—PUNJAB GAZETTE.—

23rd January 1892.—No. 32.—Messrs. E. Forrest and E. A. Down, Deputy Conservators of Forests, respectively made over and received charge of the Umballa Forest Division on the forenoon of the 4th January 1892 on the return from privilege leave of the latter officer.

No. 35.—Lála Jowála Prasád, Extra Assistant Conservator of Forests, and Mr. E. Forrest, Deputy Conservator of Forests, respectively made over and received charge of the Rawalpindi Forest Division on the afternoon of the 8th of January, 1892.

7.—CENTRAL PROVINCES GAZETTE.—

7th January 1892.—No. 130.—The following Officers of the Forest Department have passed the prescribed examination in the Vernacular, as shown below:—

MARATHI.

By the Lower Standard.

Mr. A. E. Lowrie, Deputy Conservator of Forests.

HINDI.

By the Lower Standard.

Mr. V. S. Menzies, Assistant Conservator of Forests.

23rd January 1892.—Mr. H. S. K. Edie, who has been appointed by H. M's. Secy. of State for India to be an Assistant Conservator of Forests, 2nd grade, and has been posted to the Central Provinces, reported his arrival at Bombay on the forenoon of the 21st ultimo, and at Nagpur on the forenoon of the 31st idem.

26th January 1892.—No. 438.—With reference to Notifications Nos. 8844 and 8845, dated the 30th December 1891, Mr. P. H. Clu terbuck, Assistant Conservator, made over charge of the Bhandara Forest Division to Mr. N. C. McLeod, Extra-Assistant Conservator, on the forenoon of the 2nd instant.

8.—BURMA GAZETTE —

7th January 1892.—No. I.—In supersession of Revenue Department Notification No. 185, dated the 2nd September 1891, and in exercise of the power conferred by section 33 of the Upper Burma Forest Regulation, 1887, the Chief Commissioner directs that the following rule shall be added to the rules published in Revenue Department Notification No. 59, dated the 11th April 1889:—

"5(*a*) No person shall cut, saw, convert, or remove any dead or girdled teak trees on land not included in a reserved or village forest, or the timber of any such tree, save under and subject to the conditions of a license granted by the officer in charge of a forest division or sub-division.

"Applications for licenses under this rule may be made to any Township or Sub-divisional Officer, who will forward them to the District Forest Officer for disposal. No license shall be refused by the District Forest Officer, without the approval in writing of the Deputy Commissionor of the district."

Provided that this rule should not apply to any Shan State except the State of Momeik.

11th January 1892.—No. I.—With reference to Revenue Department Notification No. 272 (Forests), dated the 25th November 1891, Mr. J. Messer, Assistant Conservator of Forests, assumed charge on the forenoon of that date of his duties as a specially appointed Working Plans Officer.

14th January 1892.—No. 4.—The following transfers are ordered consequent on the grant of furlough to Mr. J. Nisbet, Deputy Conservator of Forests :—

Mr. W. F. L. Tottenham, Assistant Conservator of Forests, from the Tharrawaddy Division to the charge of the Rangoon Division.

Mr. G. R. Long, Assistant Conservator of Forests, from Pegu to the Tharrawaddy Division.

No. 5.—The following transfers are ordered :—

Mr. A. M. Burn-Murdoch, Assistant Conservator of Forests, on relief by Mr. Samuel Carr, Assistant Conservator, from Yaméthin to the Taungdwingyi sub-division of the Minbu Forest Division.

Mr. R. F. Lowis, Extra Assistant Conservator of Forests, from Pyinmana to the Ruby Mines sub-division of the Katha Forest division.

No. 6.—Under the provisions of Article 340 (*b*) of the Civil Service Regulations, furlough to Europe for one year, seven months, and six days is granted to Mr. John Nisbet, Deputy Conservator of Forests, with effect from the 1st February 1892, or the subsequent date on which he may avail himself of it.

21st January 1892.—No. 9.—With the sanction of the Government of India Mr. J. Allmark, the officer in charge of the Government Timber Depôt and Agency at Rangoon, is appointed to be an Extra Assistant Conservator of Forests, 1st grade, with effect from the 1st January 1892.

28th January 1892.—No. 24.—Mr. Samuel Carr, who has been appointed by the Secretary of State for India to be an Assistant Conservator of Forests in this province, arrived in Rangoon on the 3rd January 1892, before noon.

Mr. Carr is posted to the Pyinmana Forest division, Upper Burma.

9.—ASSAM GAZETTE.—

5th January 1892.—No. 60G.—In supersession of General Department Notification No. 9915G., dated the 26th November 1891, published at page 582 of the *Assam Gazette* of the 28th idem, privilege leave of absence for two months, under article 291 of the Civil Service Regulations, is granted to Mr. J. T. Jellicoe, Deputy Conservator, Darrang Forest Division, with effect from the 4th December 1891.

5th January 1892.—No. 61G.—Mr. J. T. Jellicoe, Deputy Conservator of Forests, made over charge of the Darrang Forest Division to Mr. D. P. Copeland, Deputy Conservator of Forests, Kamrup, on the forenoon of the 4th December 1891.

28th January 1892.—No. 833G.—Mr. T. J. Campbell, Assistant Conservator of Forests, on return from furlough on the afternoon of the 9th November 1891, was attached to the Goalpara Forest Division, and received charge of that division from Mr. D. P. Copeland, Deputy Conservator of Forests, on the forenoon of the 16th idem.

No. 824G.—Mr. C. G. D. Fordyce, Deputy Conservator of Forests, Sibsagar Division, is transferred to the Lakhimpur Forest Division, but will continue to hold charge of the Sibsagar Division in addition to his own duties.

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